

1 WHAT IS CLAIMED IS:

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3 1. A method for removing selenium from an aqueous stream containing

4 selenium comprising passing the aqueous stream in combination with a

5 quaternary amine compound through a filter to produce an effluent

6 which is depleted in selenium content relative to the untreated

7 selenium-containing aqueous stream.

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9 2. The method of claim 1, wherein the aqueous stream containing

10 selenium is an oil refinery process wastewater.

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12 3. The method of claim 1, wherein the aqueous stream containing

13 selenium is an oil refinery process wastewater containing free and

14 soluble oil.

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16 4. The method of claim 1, wherein the filter comprises a filter media will

17 absorb or otherwise remove a quaternary amine compound from an

18 aqueous solution.

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20 5. The method of claim 4, wherein the filter media is selected from the

21 group consisting of clay, cellulose, starch, activated carbon and their

22 mixtures.

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24 6. The method of claim 1, wherein the aqueous stream is an oil refinery

25 stripped sour water and the primary form of the selenium is

26 selenocyanate.

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28 7. The method of claim 1, wherein the quaternary amine compound has

29 the general formula $R^1 R^2 R^3 R^4 N+ X-$, where $R^1 R^2 R^3 R^4$ are the same

30 or different and are alkyl or aryl groups, and where X is an anion.

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32 8. The method of claim 7, wherein the quaternary amine compound has

33 the general formula $R^1 R^2 R^3 R^4 N+ X-$, where $R^1 R^2 R^3 R^4$ are the same

1 or different and are selected from the group consisting of linear or
2 branched paraffins having a chain length of C₃ - C₃₀, and where X is a
3 halogen.

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5 9. A method for removing selenium from an aqueous stream containing
6 selenium comprising passing the aqueous stream through a filter
7 comprising a filter medium in combination with a quaternary amine to
8 produce an effluent which is depleted in selenium content relative to
9 the untreated selenium-containing aqueous stream.

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11 10. The method of claim 9, wherein the aqueous stream containing
12 selenium is an oil refinery process wastewater.

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14 11. The method of claim 9, wherein the filter medium is present as a solid
15 sorbent.

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17 12. The method of claim 9, wherein the filter media is selected from the
18 group consisting of clay, cellulose, starch, activated carbon and their
19 mixtures.

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21 13. The method of claim 9, wherein the aqueous stream is an oil refinery
22 stripped sour water and the primary form of the selenium is
23 selenocyanate.

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25 14. The method of claim 9, further comprising a prefiltering step.

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27 15. The method of claim 9, wherein the effluent is passed through a filter
28 medium comprising activated carbon to produce a second effluent
29 which is depleted in selenium content relative to the first effluent.

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31 16. The method of claim 15, wherein the second effluent is contacted by an
32 anion exchange resin to produce a third effluent which is depleted in
33 selenium content relative to the second effluent.

1 17. A method for removing selenium from an aqueous stream containing
2 selenium comprising passing the aqueous stream through a filter
3 comprising a filter medium in combination with a quaternary amine to
4 produce a first effluent which is depleted in selenium content relative to
5 the untreated selenium-containing aqueous stream; passing the first
6 effluent through a filter medium comprising activated carbon to produce
7 a second effluent which is depleted in selenium content relative to the
8 first effluent; and contacting the second effluent by an anion exchange
9 resin to produce a third effluent, which is depleted in selenium content
10 relative to the second effluent.